

configured to control different functionality, for example, a shape selection box, a text entry box, a hatching selection box, or a box configured to modify some other feature known in the art.

[0097] Messaging device **1002** further comprises an actuator (not shown in FIG. **10**) configured to output a haptic effect configured to simulate a texture. In some embodiments, the user can feel this texture on the surface of display **1016**. For example, in some embodiments, when the user touches the section of display **1016** associated line selection box **1006** the actuator may output a haptic effect configured to simulate a texture. In some embodiments, messaging device **1002** may output a haptic effect configured to simulate a texture associated with the thickness of the line the user selects, for example, a coarse texture for thick line **1008** and a soft texture for thin line **1012**. In some embodiments, messaging device **1002** may output the haptic effect while the user draws the object. In other embodiments, messaging device **1002** may output the haptic effect only when the user selects the line. In still other embodiments, messaging device **1002** may output a haptic effect when the user interacts with three-dimensional object **1004**, and output no haptic effect when the user interacts with other sections of display **1016**. In some embodiments, messaging device **1002** may comprise more than one actuator, as described herein in relation to system **500**.

[0098] FIG. **11** is an illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention. FIG. **11** comprises a system **1100**, which is similar to system **500** above. As shown in FIG. **11**, messaging device **1102** comprises a display **1116** positioned underneath a touch-sensitive interface. In some embodiments (not shown in FIG. **11**), system **1100** may further comprise a manipulandum, such as a mouse, scroll wheel, or roller ball, which allows the user to interact with the graphical user interface on display **1116**.

[0099] As shown in FIG. **11**, display **1116** comprises an interface for reading a text file, which comprises a scrollbar track **1104**, scrollbar **1106**, and text **1108**. In the embodiment shown in FIG. **11**, the user may move scrollbar **1106** up or down along scrollbar track **1104** in order to scroll to different sections of text **1108**. In some embodiments, the user may tap a section of scrollbar track **1104** in order to move scrollbar **1106** and text **1108** to the section associated with that point on scrollbar track **1104**. In other embodiments, scrollbar track **1104** and scrollbar **1106** may comprise a different appearance or perform a different function. For example, in some embodiments, scrollbar track **1104** and scrollbar **1106** may be positioned on the top or bottom of display **1116** and allow the user to move the display horizontally. In further embodiments, scrollbar track **1104** and scrollbar **1106** may be used to control different types of user interfaces, for example drawing applications, web browsing applications, email applications, or some other application known in the art.

[0100] Messaging device **1102** further comprises an actuator (not shown in FIG. **11**) configured to output a haptic effect configured to simulate a texture. In some embodiments, the user can feel this texture on the surface of display **1116**. For example, in some embodiments, when the user touches the section of display **1116** associated with scrollbar **1106** the actuator may output a haptic effect configured to simulate a texture. In such an embodiment, the actuator may not output a different texture when the user touches a part of scrollbar track **1104**. Further, in some embodiments, the actuator may output a texture that changes as the user moves scrollbar **1106**

along scrollbar track **1104**. For example, in some embodiments, the actuator may output a haptic effect configured to simulate a texture that becomes coarser as the user moves further down scrollbar track **1104**. Such an embodiment may allow the user to quickly determine his/her finger's location on scrollbar track **1104**, without looking at display **1106**, or without being distracted from reading text **1108**. In some embodiments, messaging device **1102** may comprise more than one actuator, as described herein in relation to system **500**.

[0101] FIG. **12** is an illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention. FIG. **12** comprises a system **1200**, which is similar to system **500** above. As shown in FIG. **12**, messaging device **1202** comprises a display **1216** positioned underneath a touch-sensitive interface. In some embodiments (not shown in FIG. **12**), system **1200** may further comprise a manipulandum, such as a mouse, scroll wheel, or roller ball, which allows the user to interact with the graphical user interface on display **1216**.

[0102] As shown in FIG. **12**, display **1216** comprises a graphical user interface for a mapping application or Global Positioning System (GPS) receiver. The graphical user interface comprises a route **1204**, destination **1206**, and several buildings **1208**, **1210**, and **1212** along or near the route **1204**. In some embodiments, route **1204** may be much longer than shown in FIG. **5**. For example, in some embodiments, route **1204** may require several screens to be shown in its entirety. Thus, it may be subdivided such that only a portion of route **1204** is shown at any one time. In further embodiments, waypoints and other items known in the art may be shown in the graphical user interface.

[0103] Messaging device **1202** further comprises an actuator (not shown in FIG. **12**) configured to output a haptic effect configured to simulate a texture. In some embodiments, the user can feel this texture on the surface of display **1216**. For example, in some embodiments, when the user touches the section of display **1216** associated with destination **1206** the actuator may output a haptic effect configured to simulate a texture. In such an embodiment, the actuator may not output a texture when the user touches other sections of display **1216**. Thus, the texture may allow the user to quickly determine destination **1206**'s location on display **1216**. In other embodiments, additional features of the graphical user interface may comprise a texture. For example, route **1204** may comprise a texture. In such an embodiment, the user may move his/her finger over the surface of display **1216**, and feel a texture when a finger touches route **1204**.

[0104] In still other embodiments, messaging device **1202** may automatically assign textures to other buildings along the user's route. For example, in some embodiments, the messaging device may automatically assign a texture to certain types of buildings, for example all gas stations, restaurants, or hospitals. In one embodiment, building **1208** may comprise a hospital, building **1210** may comprise a mall, and building **1212** may comprise a gas station. In such an embodiment, the user may search for a gas station. As a part of this search, the user may enter a search menu that allows the user to assign a texture to all gas stations along his/her route. Then, the user may run his/her finger over the surface of display **1216** to find a gas station. When the user touches display **1216**, he/she will feel a texture on the section of display **1216** associated with building **1212** and know that it is a gas station. In other embodiments, different sections of the interface may be asso-